

"ECONOMY," "EFFICIENCY," "FORESIGHT" KEY NOTES OF BOTTOMLEY'S VALEDICTORY

PROSPERITY WILL NOT LAST ALWAYS, GIST OF HIS FAREWELL

(Continued from Page 5)

the cost of marketing our sugar during the next few years. There has been a tremendous expansion in the sugar industry of Cuba and in the beet sugar industry of the United States, and when the European nations can again devote themselves to peaceful occupations there will be a production of sugar which this world has never before experienced, with a consequent lowering of prices.

"It behooves us, therefore, while our industry is profitable, to provide for the future. This, I firmly believe, is being done—some are paying off bonds and other indebtedness and laying aside emergency funds against times of need, and others are putting in much-needed improvements in the mills and in the fields, whereby the cost of production may be lowered and yields increased, and all of the plantations are preparing in their own way to fit themselves for the struggle which is surely before us. My only hope is that this conservative policy may continue, and if it does, I feel sure that when the time of storm comes we shall not be found wanting.

Year's Crop Good
"The total production of sugar for the year ending September 30, last, was 503,483 short tons—nearly 53,000 tons less than the previous year. The island of Hawaii led in production, producing 197,654 tons, and next in order came Maui with 150,312 tons; Oahu, 126,966 tons, and Kauai with 109,551 tons.

Unfavorable weather conditions on the island of Hawaii during the crop season very materially reduced the production of that island, and if it had not been for this the production of the islands for this year would have been only slightly lower than that of the previous year.

"It is a pleasure and a source of gratification to all of us that while enjoying exceedingly prosperous times the plantations have unselfishly and voluntarily shared this prosperity with those who till the soil and perform the manual labor necessary in the production of sugar. Whatever may be the criticism of the high percentage of bonus paid to the plantation workers, it is unquestionably true that the fundamental principle underlying the bonus system, which is, that in times of prosperity the laborer shall share therein with the employer, is correct; and it is to the credit of the sugar plantations that they have been quick to apply this principle and deal justly and generously with their laborers.

Labor Conditions Good

"Generally speaking, the labor conditions on the plantations during the year have been fairly satisfactory. Some of the plantations have been more or less pressed for labor at different times, but I cannot recall any particular period when all of the laborers needed to conduct plantation operations were on hand. If at any time all of the plantations had all the laborers required, I fear that some of us would think that the millennium had arrived.

"The payment of a portion of the bonus monthly and the extension thereof to contractors has served to keep plantation hands contented and on the job nearly all the time. Filipino immigration has continued without interruption and the labor committee will report that for the year under consideration, a total of 1074 men, 141 women, and 134 children have arrived in Hawaii from the Philippine Islands. It is our hope and desire that this immigration may continue. Not only are we receiving benefits therefrom, but the Filipinos also are profiting. Very considerable sums of money are being taken home by laborers, and those who return are certainly more competent and efficient through their experience as plantation laborers in Hawaii.

Work Holds Promise

"The work being done in connection with plantation experiments, which is referred to in the report of the experiment station committee, seems to me to give promise of great results, and I trust that these experiments will be continued and extended through the co-operation of the plantation managers. The plan now in operation for training a number of young men in the agricultural and chemical departments of the station should fill a long-felt want, and from these young men we may surely expect to find some of our future managers and head overseers.

"In passing, I would like also to con-

gratulate the pathological division on the excellent success which has attended its work in its connection with the search for parasites for the anomala beetle, and the establishment on the 'infected' fields of one species of these parasites, viz., *Scolia* wasps.

"The Makiki station has been extended by the purchase of a lot containing somewhat over an acre of land adjoining the present station, and plans have been approved and a contract let for a large building which will provide additional room for the staff and the valuable station library and entomological collection. With the completion of these improvements, which are being made at a time when the plantations can well afford to pay for them, the Makiki section should be well equipped for its work for some time to come.

"One of the most important subjects which will be brought to your attention at this meeting is the necessity for a great improvement being made in the quality of sugar which we are sending to the refiners, and I trust this most important matter will receive your careful consideration and that some means will be devised for the establishment of a standard of quality which will be adhered to by all.

"It is a truth too well known to need repetition, that in order to obtain the best market price, a manufacturer has to be continually on the alert to improve the quality of his wares; and if, for one reason or another, the quality is allowed to decline, the manufacturer soon finds, in these days of competition, that he is losing his market, or has to take a lower price than his competitors. This is equally true of the manufacture of sugar as of anything else.

Competition Increasing

"Competition in the sugar business, as in almost every other line of business, is becoming keener all the time, and we may be sure that the Cubans, with their ever-increasing crops, which they sell in competition with each other and with Hawaiian and Porto Rican sugars, are making an opportunity of making a sugar which will be in conformity with the requirements of the buyers. The result will be that unless radical improvements are made at the beginning of this crop, and continued through the season, new contracts will only be made subject to a deduction, based on refining value, greatly in excess of anything we have ever had to pay in the past.

"Though we have long been accustomed to paying more attention to getting as much as possible for our sugar than we have to their quality, I feel sure that different methods must be adopted in the future, and that every effort must be made to change Hawaiian sugars from being the least desirable to being one of the most desirable sugars offered to the refiners, and in doing this it must not be forgotten that owing to the high content of our sugars, we are already at a disadvantage as compared with the Cubans. It should also be remembered that a very few, perhaps even one plantation, sending a poor quality of sugar, is quite sufficient to give the whole business a black eye, and that all the good work which is being done by others, therefore I say that I believe that all the plantations should agree to make a standard grade of sugar which will be satisfactory to the refiners and that through its experiment station, the association should see that this standard is lived up to by all.

Attendance Full

"It is very pleasant to see so full an attendance of members at this meeting, including several of our charter members, namely, Mr. E. C. Jones, Mr. W. O. Smith, Mr. George Wilcox, I regret, however, that among the absentees there are three gentlemen who have by their long experience and great knowledge of the sugar business contributed much to the success of our annual meetings in the past—I mean Mr. Tenney, Mr. J. P. Cooke and Mr. Sweeney. Two of them, Mr. Cooke and Mr. Sweeney, have been very seriously ill, as you all know, but I am glad to say that they are now considerably better, and it is, I know, the earnest hope of all of us that both these gentlemen will be restored to health at an early date and that we may soon again have the benefit of their wise and kindly advice.

My Observation of these meetings

extending over a period of about ten years, leads me strongly to believe that the interest in these annual gatherings is ever increasing, and that the participation in discussions following the reading of the papers is growing more and more valuable year after year. This is the greatest encouragement which we are all alive to the problems which have to be faced, for gentlemen, I feel that we realize that when conditions become normal, low prices must be expected, even with a continuance of the moderate protection which we are now getting. I, for one, however, have no fear for the future. We have met and overcome our bad times in the past and we will meet and overcome them in the future, and I have no doubt that the men at the head of our plantations, who, by their energy and resourcefulness, have brought the sugar industry of Hawaii to the high position which it now occupies, will be fully able to cope with whatever emergencies may arise."

Russian Sugar Crop

"PETROGRAD, November 23.—The latest report from Karlovy says that the collection of beetroot is nearly completed all over that Government. It makes about six to seven tons per acre. Labor is ample, but hands for preparing the ground for next year's sowing are scarce. Sugar factories are working full time. M. D. Dietrich, a member of the Imperial Council, when at Kiev recently, said measures had been taken to obviate any sugar crisis.

The beet harvest weather has been satisfactory. The root is of fine quality and better than last year's as to sugar content. If all the beetroot is harvested it should yield 1,607,130 tons of sugar, which with the carry-over from last campaign will be quite enough to satisfy the army and the population.

NEW VARIETIES OF CANE OUSTING OLD ISLAND FAVORITES

New varieties of sugar cane are edging on the old standard varieties in the plantations of the Islands according to figures submitted to the meeting of the sugar planters' association yesterday by H. P. Agee, director of the association experiment station. Principally D1135 and H109 are spreading rapidly on the plantations, gaining the favor of the planters. High voice was given H109 yesterday and of this variety, Director Agee stated: "H109 is a better variety of cane than Lahaina ever was at its best. On irrigated plantations, H109 will give a better yield than Lahaina, though it probably is not as well suited for unirrigated plantations. The cane is well suited for the experimental work and it would be well if plantations on which it has not been tried were planted with several hundred acres of H109 to appreciate its results. Plantations doing this will be well repaid." Mr. Agee's figures in acres show:

D1135: 1914 crop, Hawaii 340, Kauai 154, Maui 332, Oahu 789, total 1495; 1916 crop, Hawaii 1149, Kauai 711, Maui 1113, Oahu 1394, total 4357; 1918 crop, Hawaii 2372, Kauai 1518, Maui 1779, Oahu 1294, total 7457.

H109: 1914 crop, Oahu 26; 1916 crop, Hawaii 22, Kauai 38, Oahu 498, total 558; 1918 crop, Hawaii 72, Kauai 103, Maui 229, Oahu 2314, total 2717. Under cultivation now for 1917 and 1918 crops there is 3928 acres of H109 and 12,688 acres of D1135.

Other varieties being extended are Striped Mexican and Striped Tip.

The leading varieties, old and new, under cultivation for the 1917 and 1918 crops in acres are: Yellow Caledonia, 115,600; Lahaina, 65,400; D1135, 12,600; Striped Tip, 7,200; Rose Bamboo, 5090; D117, 4000; H109, 3028; Yellow Tip, 1900; Yellow Bamboo, 1900; and Striped Mexican, 1800.

Other important Hawaiian seedlings are H146, H227, H230 and H233. These are grown now on areas of from 100 to 400 acres.

Kauai Plantation Notes

The cane on Kauai for the coming crop is looking, on the whole, very well. There has been an abundant supply of water this summer and all the reservoirs are full to overflowing. The only drawback is that the summer has been exceptionally cool. There has not been any prolonged hot weather and as a consequence the cane joints are shorter than usual. However, preliminary cane analysis at Kilanea has given very satisfactory purities for this time of year.

All the mills either have begun grinding or are just about to begin. Since the cane has been grinding for several weeks, Kilanea and Lae have begun about December 1st. Makaweli will begin about December 8, McBryde December 18, and Kilanea about December 20.

New Generator at McBryde

At McBryde they are installing a 300 K. W. turbo-generator set. This outfit is to serve a double purpose. When there is a break in the power line over the mountain this apparatus will be used as an auxiliary power plant, supplying power for loading sugar at the wharf, and for the small electrical apparatus at the mill. When not needed as an auxiliary power plant it will be used to drive the shredder.

The shredder is to be fitted up so that it can be driven either by an electric motor or a steam turbine.

Improvements at Makaweli

At Makaweli there have been greatly improving the surroundings of the "Hoole Camp." The road from the government road to the mill, passing through the "Hoole Camp," which used to be a dust bath in dry weather and a bog in rainy weather, has been macadamized and concrete sidewalks laid the whole length. The boarding house has been moved from a small, dark, dirty building into large clean quarters. The old, dirty, building used as an office is now being replaced by a fine concrete structure, placed directly in front of the old office.

MOLASSES FUEL AT KEALIA

At Kealia, in former oil seasons, power for the machine shops, pumping, and lighting was obtained from gasoline engines and coal. This year all the power is by burning molasses. They are obtaining about fifty horse power. By installing a home-made generator, they expect to be able to increase the amount of horse power obtainable by ten or twenty per cent.

At Kilanea the cold wet weather has not yet arrived. Consequently the cane is still making good growth.

HILO NOW ON THE LOS ANGELES MAP

HILO, December 2.—President McKay of the Hilopians of the United States has received a letter from Proprietor John S. Mitchell of the Los Angeles chamber of commerce, written to board the Great Northern at sea November 22:

"Dear Mr. McKay: I want to thank you and our Hilop friends for your kind reception at the 'Seaside Gateway' (well named). We hope to arrange with the Great Northern for the privilege of having here in Hilop at seven in the morning, so passengers may see your city as well as the interesting vicinity.

"Hilo is on our map and we hope to send you many tourists who will stay longer than we could."

TRANSITION STARTS EXPERS HOTLY ARGUING

To Burn Or Not To Burn Is Question That Excites Sugar Planters' Association

BURNING-OFF BURNING ISSUE OF BIG MEETING

Liveliest Discussions of the Day Provoked By Appearance of Disputed Theories

To burn or not to burn the trash on cane fields was the question when the report of the committee on cultivation, fertilization and irrigation on irrigated plantations was submitted to the meeting of the Hawaiian Sugar Planters' Association yesterday by George F. Renton, chairman.

The merits and demerits of "burning-off" became the burning issue of the session. The subject provoked the liveliest and most general discussion of the day and was not without a vein of humor as each member seemed to be "a man convinced against his will and of the same opinion still."

Three advantages were pointed out by Mr. Renton in leading the discussion for the practice of leaving trash on the fields. These are promotion of land fertility, retention of irrigation water in the soil and lessening of the cost of weeding.

In this connection his report points out a method of reducing the cost of irrigation by leaving the trash in alternate furrows and irrigating the intervening furrows from which the leaves and refuse have been removed, the idea being to leave the trash in the alternate furrows to act as a mulch to preserve the moisture in the soil.

J. T. Muir raised the bugbear about which the burning-off problem revolved. "Where would we be," he said, "if every plantation did not burn off? Would there be enough labor to go around?" Mr. Renton admitted that there would not be enough labor, but that at the beginning of the crop, at least a few fields could be handled without burning-off. H. B. Penhallow pointed out that two fields on his plantation handled without burning-off were much cheaper to care for and had promising yields.

Gaylord P. Wilcox told of the advantages of keeping the trash on fields saying that it took less men to irrigate and less men to hoe, that the trash rotted well and that fields used thus were working out good yield.

F. E. Baldwin stated that there was much to be said on either side of the question in labor but that if all cane was cut without burning it would be eleven or twelve months before the harvest would be completed and that much of the cane would rot.

Labor the Question

The discussion quickly simmered down to the question of whether if the trash were left on all fields could the crop be gotten in the same time with the same number of men.

Mr. Gibb stated that even if the labor were available his opinion was that fifty per cent of the trash was retained with light burning which would be not enough to hurt the soil, that is to burn before cutting and leaving the cane tops on the ground.

Mr. Agee said that there was no question but that the trash was a benefit to the soil as it put organic matter back in the soil, and that there was a possibility that too much trash might be turned back into the soil.

Asked how much more labor would be needed to permit leaving trash on all fields and eliminating burning-off, Mr. Renton replied that from twenty-five to thirty per cent more labor would be needed. On the question of labor involved the subject was dropped.

SECRETARY MAKES ANNUAL REPORT

W. O. Smith Shows Facts and Figures For Year At Association Meeting

W. O. Smith, secretary-treasurer of the sugar planters' association, made his annual report at the opening of the annual meeting yesterday.

The sugar crop report for the year, prepared by R. D. Mead, director of the bureau of labor and statistics, the report stated, showed for the year ending September 30, 1916, a total tonnage of 503,483 short tons, being \$2,802 tons less than the previous year.

New members reported by Secretary Smith were Alexander Valentine, W. P. Naquin and J. L. Coburn. The resignation of W. J. Dyer was reported. The membership of the association is 129.

In his report Mr. Smith mentions the length of W. O. Gage, saying: "Mr. W. O. Gage had been a member of the association for many years and his death on August 22, 1916, was mourned by a large circle of acquaintances and friends. His knowledge of the cultivation and manufacture of sugar was extensive and thorough. He was an efficient executive officer and beloved by all associated with him."

ASSOCIATION HEARTILY ENDORSES WORK DONE BY LOCAL EXPERIMENTAL STATION

HEARTILY endorsing the work of the experiment station, the members of the Hawaiian Sugar Planters' Association yesterday gave their attention to the report of the experiment station committee, spending the better part of the day in the discussion of the various important points raised in the report.

Progress in the propagation of parasites for cane pests; the problem of the so-called Lahaina disease; and other subjects discussed yesterday were the main topics of discussion on the report led by J. F. C. Hagen, chairman of the committee.

The consensus of opinion was that everything possible should be done to advance and extend the work of the experiment station. Increase in the work of field experiments at the various plantations is planned extensively for the future for the benefit of plantation managers.

The experiment station committee and the trustees will appreciate any suggestions that the plantation managers have regarding the work of the experiment station. Instead of doing the work at the station and having the managers come there hereafter the work will be done at the plantations and the staff will go to the managers with their work.

Plantation Experiments

J. T. Muir endorsed Mr. Hagen's plan of having the experiments carried on at the various plantations and others expressed similar views. No objection was stated to the expense when the question was raised. H. P. Agee, director of the station, was asked to have the station bulletin on cane varieties printed every year instead of twice a year.

Taking up the subject of cane pests, Director Agee, leading the discussion, declared that one of the very definite achievements of the station this year had been the establishment of the *Anomala* beetle as a parasite for the *Anomala* beetle after three and a half years work on the investigation.

F. A. G. Muir, entomologist, at the station described the work on the *Anomala* beetle, stating that five different parasites had been imported but only the *Scolia* wasp had been definitely established. This is the first record of the *Scolia* wasp having been transferred to another country. Mr. Muir said:

"The successful outcome of the *Scolia* experiment depends on the faculty of the wasp in establishing itself permanently. It will be twelve months or so before definite judgment can be passed. An important discovery is that we are convinced that because a field is once infested with *Anomala* beetle does not mean that it will be infested forever. Leaving trash on the fields does not apparently help the development of the *Anomala* pest nor will burning-off necessarily give any relief."

Leafhopper Pest

On the leafhopper pest the report states: "Conditions respecting this pest have been about normal. Several plantations have reported outbreaks, but for the most part these were not serious. The depredations at the plantation of the Hawaiian Agricultural Company have caused definite damage, but Mr. Sweeney reports that the situation shows improvement. In the upper fields of the Oahu Sugar Company there is an extensive infestation of leafhoppers at the present time."

The eight parasites have been discovered for leafhopper but are not yet definitely established. No change in the situation regarding the cane borer was reported. The *Teuchid* fly as a parasite is attaining maximum efficiency in all districts except Kauai, Hawaii.

On the Leafhopper and Anomala

Beetle pests the report states: "A year ago we stated that it was Mr. Muir's plan to effect a more rigid control of the leafhoppers by securing additional egg-parasites from Formosa and it is now gratifying to report that he has introduced three new species and that there is good reason to expect that these parasites will become established."

These Mr. Muir brought with him in returning from the Philippines by way of Formosa. One of them is a Myrmid of the genus *Paranagrus* and very similar to *Paranagrus* *optabilis*. The other two valuable species introduced from Australia two years ago.

The other two *Paranagrus* leafhopper egg-parasites were species of *Ootetrastichus* of the family *Ootetrastichidae* and are related to the *Ootetrastichus* *beatus* introduced from Fiji in 1905. One of these species issued in sufficient numbers from the material brought by Mr. Muir for colonies to be sent directly to several plantations. These retained in cages failed to breed, but it is hoped that they became established from the liberated colonies. The other species of *Paranagrus* *Ootetrastichus* issued in smaller numbers from the original material brought in by Mr. Muir, and though the entire colony was retained in the breeding cages they have propagated readily, and colonies have already been distributed to favorable localities.

The breeding work has been handled by Mr. Sweeney and Mr. Timberlake, with the result that colonies are now being liberated on plantations where there is an abundance of leafhoppers. Twenty-eight colonies have been distributed to date.

The comparative facility with which this project is proceeding should in no way belittle the attainment. Mr. Muir accomplished a very important piece of work in securing three additional egg-parasites of the leafhopper, and the success in handling the introduced material is due to the expert attention it has received from Mr. Sweeney and Mr. Timberlake. Despite the natural enemies already here there have been alarming leafhopper outbreaks within the past few years. The seriousness of this pest is well known and these steps toward its more rigid control deserve more than casual consideration.

The Anomala Beetle

The beetle is spreading, slowly extending its damage into the cane fields at the outskirts of the infested district.

One outstanding center of infestation has been noted about one mile without the principal area. But the *Anomala* beetle is confined as yet to the plantations of the Honolulu Plantation Company and the Oahu Sugar Company (including the Waipaho plantation). Additional centers of infestation are to be expected.

Mr. Sweeney informs us in calling attention to cane trash and the like as a means of spreading the pest, that the *Anomala* beetle is not a pest of the cane trash, but that the damage of such infestation is not so much caused by the beetle's own power of flight, but that they have not been established throughout the cane areas of Oahu, he stated, and he attributed this to the fact that the females deposit their eggs before emerging from the soil for the first time.

Mr. Sweeney reports that in his cane infestation areas once heavily infested have not remained so, and that most crops of cane are growing in fields where previously much of the cane was killed by the grub. The grub most heavily infested one year did not necessarily coincide with the worst season of the previous year.

During the wet weather of last winter the *Anomala* fungus was an active agent in reducing the multiplication of the grubs. It was also noted that the grubs sought the drier ridges when the fields were wet from the heavy rains, thus relieving the damage immediately upon the cane stools in the furrow.

It is today an open question whether the retention of cane trash on a field will be beneficial or otherwise in connection with the *Anomala* beetle. According to Mr. Sweeney from the great abundance of grubs beneath the layers of trash in fields where trash has been left it looks as though this organic matter would offer an attraction that would keep them from the cane stools. On the other hand, it may furnish so favorable a breeding ground as to result in such a vast increase in the total number of beetles that in the end the damage to the cane might be greater than if the trash had been burned.

This point will be studied with great interest, as we feel that the practice of retaining trash may have an important bearing one way or the other.

Enemies of Anomala

Work along this subject has revealed itself into introducing and establishing a number of natural enemies and parasites which have been found through Mr. Muir's efforts in the Orient during the past three years.

A number of white grub parasites were located in the Philippines and much of the past year has been devoted to efforts to successfully transport these to Honolulu. Much material was lost before successful ways of handling the insects were found. The length of the voyage, infrequency of ships, and irregular sailing schedules have contributed to the disappointment which are to be recognized as a part of the routine of this work.

A quantity of material was brought in by Mr. Muir when he returned in March, Mr. Osborn, who has assisted in the work in the Philippines from November, 1915, brought more when he returned in July of this year. At the present writing Mr. Muir is on his way to Japan with a collection of parasites where he will be met by Mr. Osborn, who will return to Honolulu with the material. There is great advantage in making consignments in this manner under expert attention.

The more important of the parasites now under consideration are the wasps: *Scolia* manille, *Tiphia* compressa, *Tiphia* sp., and the flies: *Protophaga* sp. and *Dexia* sp. Mr. Sweeney supplies information on *Scolia* manille as follows:

"This is a small wasp that digs in the ground, finds a grub, stings and paralyzes it; then affixes an egg in an upright position on the middle of the ventral surface of the grub. The egg hatches in a few days, a cocoon is spun in which further development to the adult takes place in three or four weeks according to the season. The parasite breeds on grubs of both *Anomala* and *Adoretus* (Japanese rose beetle) and apparently produces successive generations throughout the year.

Mr. Osborn was very successful in breeding *Scolia* at Los Banos, P. I., and sent consecutive shipments of the cocoons for several months. In all twelve consignments, totaling about 2,000 were received between January and May. So few adults emerged from these cocoons that it was decided to introduce colonies of adults and to this end Mr. Osborn brought a cage of them in July. Fifty survived the journey. Some were liberated in infested areas, others retained for breeding.

There is now definite evidence that these *Scolia* wasps are becoming established. They have recently been observed in numbers in field 11 of the Oahu Sugar Co., where the first liberation was made in March, 1916.

Other Cane Diseases

Infestious top rot is reported by Dr. Lyon as having appeared on Oahu and Maui during the year. During the previous eight years this disease has been recognized on Kauai only. Last instance the malady was first observed in one or two stools near the edge of a field and from these it spread rather rapidly to adjoining cane. By cutting and burning, all affected canes, the spread of the disease was arrested. According to Dr. Lyon this disease has great possibilities for harm. Our knowledge of it is yet imperfect. In other countries, particularly in Mexico, it is said to have caused great damage, spreading like a fire through the fields despite attempts at its control. Dr. Lyon emphasizes the importance of early identification and prompt action in confining with this trouble. He states that the diseased cane dies quickly and turning brown, the tough mucus and makes it easier to pull the affected stools conspicuous in the field.

Find Fungus Growth

Specimens of a new peculiar leaf spot affecting H-333 were received from Kauai. The trouble disappeared rapidly, however.

"We were recently called upon to investigate a peculiar malady which appeared in a small patch of H-333 in Hawaii. Doctor Lyon believes the trouble to be caused by a parasitic fungus which attacks the leaf bases, causing the leaves to turn yellow and die prematurely."

H. L. Lyon, pathologist, described the effect of top rot on cane, explaining how it attacks the tender leaves first. He stated that H-333 cane variety could not be grown extensively on account of the fact that it will probably be wiped out every six or seven years. The work of Mr. Burgess on soil study has shown that the soils are highly acid and that ammonification and nitrification are very low. An investigation is under way to determine the relative merits of finely pulverized coarse sand commonly employed in liming acid lands.

On the subject of fertilizer control work, Mr. Agee stated that experiments show that the majority of the planters can increase their fertilizations. By beginning with a slight increase, he said, planters can go in for more intensive cultivation and fertilization.

Work On Seedlings

In reviewing the work on raising seedlings, Mr. Agee stated that during the coming season the station proposes to propagate seedlings on all the islands and arrangements are already under way with several plantations to facilitate this work.

Reporting irrigation and soil moisture experiments, Mr. Agee illustrated the moisture conserving power of trash left on the fields. With trash the soil showed thirty per cent of moisture before irrigation and thirty-six per cent after irrigation and without trash twenty-six and a half per cent before irrigation and thirty-two per cent after irrigation.

Putting cane trash in alternate furrows and leaving the intervening furrows clear for irrigation was reported as giving favorable results as the scheme surmounts many difficulties in handling trash on irrigated plantations and offers pronounced possibilities of economy on irrigation.

Discussion On Report

Discussion on the report centered on the success of H-109 cane variety, need of potash in the soil and the work of extending the experiment to the plantations. Mr. Agee and Mr. Larson of the station have many experiments under way now, but none will show definite results before a year. Confidence was expressed that the experiments would prove most valuable, and it was here that the members of the association gave their hearty endorsement to extension of this work as the best means of raising the work of the station in finding "the best way to raise larger crops at less expense per ton of sugar ready to ship."

On the subject of potash Mr. Bottomley raised the question of whether any effect was felt from lack of this ingredient of fertilization. Mr. Agee pointed out that the more extensive use of nitrates had done more good than the absence of potash had done harm. The soil of Hawaii, he said, may not need as much potash as is supposed.

Mr. Peek stated that it is impossible to tell at this time whether the loss of potash is felt or not, but from the appearance of some cane indications are that it has suffered from the loss. His belief was that unless some other fertilizer ingredient was found to replace potash the yield of cane would suffer.

"It is sound practice," he said, "to turn as much as possible of potash to the soil. It is a policy of conservation that will have its reward in the future."

James Johnston, of Okaala, stated that the increased percentage of nitrogen in the soil increases the yield of cane on the Hilo station. The highest percentages of yields being realized of any in the last ten years. However, he said it is a question whether the added use of potash would not have increased the cane yield even more.